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Studies on evaluation of *Dolichos bean*–Pole type Germplasm (*Dolichos lablab* L.) for growth and yield characteristics under Central Telangana zone

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Abstract

A field experiment was conducted at Vegetable Research Station, Rajendranagar, SKLTSHU, Hyderabad of Central Telangana zone in the Telangana state, India for three consecutive years of 2019-20, 2020-21,2021-22 for *rabi* season with Three-pole type Dolichos Bean germplasm along with two standard check varieties. The experiment was laid by adopting Randomized Complete Block Design with four replications. Significant differences were found for all the parameters among the germplasm under study. The results revealed that, significantly maximum Podlength was recorded provide under PSRJ-13021-2 (14.66 cm) is on par with Pusa Early Prolific (14.46 cm) whereas minimum pod length was noticed under PSRJ -13008 (7.64 cm), maximum number of seeds per pod was noticed under Pusa Early Prolific (6.90) is on par with PSRJ-13021-2 (6.62). Pod yield per plant was recorded maximum under PSRJ-13021-2 (697.67 g) followed by the check variety Pusa Early Prolific (647.08 g). Similarly, Maximum pod yield per hectare was recorded under PSRJ -13021-2 (38.76 t) followed by the check variety Pusa Early Prolific (35.95 t) and minimum pod yield per hectare was reported in PSRJ -13008 (28.21 t) is due to the yield contributing characters which ultimately increases the pod yield per hectare.

Keywords: Dolichos bean, germplasm, growth parameters, yield parameters and pod yield per plant

Introduction

Dolichos or Lablab bean (Lablab purpureus) (2n=2x=22) belongs to family fabaceae which is commonly known as Indian bean, Hyacinth bean, sem, Egyptian kidney bean, bonavist bean, avarai and avari chikkudu is one of the most an important vegetable crop of Indian origin. It is a very nutritive vegetable grown for the consumption of pods, green seeds and dry seeds as pulse too. It occupies unique position for vegetable purpose among the legume vegetables (Biju et al., 2001)^[2]. It is a good source of protein, minerals and vitamins (Basu et al., 2002) ^[1]. Regional preferences are predominant, playing an important role in its cultivation. The protein content of pods and seeds ranges from 10-19% and 15-25% respectively. The green pods are consumed in South India, whereas white ones are preferred in eastern India and green, fleshy pods in North India. Uttar Pradesh, Madhya Pradesh, Maharashtra, Andhra Pradesh, Telangana, Tamil Nadu, Haryana, West Bengal and northeastern states are the major Dolichos growing states. It can be grown in a wide range of soils having pH of 7.5 is ideal. Among the legumes, dolichos bean constituents an important source of therapeutic agents used in the modern as well as traditional system of medicine (Morris, 2009) ^[5]. In fact it is considered as a multipurpose crop since it is used for forage, weed control, soil improvement and soil protection (Mass, 2005)^[3]. Therefore, Selection of high yielding short duration photo insensitive pole type Dolichos Bean varieties are very much essential for profitable agriculture to augment the farmers income.

Materials and Methods

A Three year experiment was carried out at Vegetable Research Station, SKLTSHU, Hyderabad during *Rabi* season of 2019-20, 2020-21, 2021-22. The trial was laid in a Randomized Complete Block Design (RCBD) with four replications and five treatments. The treatments or the germplasm includes PSRJ-13008, PSRJ-13021-2, JBT-38/36 along with two standard check varieties namely Pusa early prolific and RND-1. The seeds were sown in month of last week of September. The standard recommended packages of practices of SKLTSHU were followed for raising the successful crop.

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Periodical observations were recorded on growth and yield parameters. Five plants were randomly selected and tagged at vegetative stage from each treatment to record the data on the following attributes. The observations recorded are Plant height (cm), No. of branches, Days to first flowering, Days to 50% flowering, No. of pods per Cluster, No. of seeds per pod, Pod length (cm), Pod girth (cm), Pod weight (g), Pod yield per plant (g) and Pod yield per hectare (t). The data for different characters were statistically analyzed in ANOVA. Significant difference was observed for all the parameters for three years are presented in tables.

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Fig 1: General view of the experimental field



Fig2: Dolichos Bean germplasm along with Check varieties

Results and Discussion

The results of pooled analysis of three years obtained from the present investigation on "Studies on evaluation of Dolichos bean –Pole type Germplasm (*Dolichos lablab* L.) for growth and yield characteristics under Central Telangana zone" are discussed and presented below.

Growth Parameters

The data pertaining to pooled analysis of vegetative parameters are presented in Table 1.

Among the pooled analysis of three years data, Plant height was recorded maximum in RND-1 (3.72 m) is followed by PSRJ -13008 (3.55 m), whereas minimum was recorded under Pusa Early Prolific (3.26 m). Maximum number of branches ^[2]

was recorded in JBT-38/36 (7.55) is on par with Pusa Early Prolific (7.45) followed by PSRJ-13021-2 (6.81) and minimum number of branches was recorded in PSRJ -13008 (6.37) in all three years. Minimum number of days to flowering was noticed in JBT -38/36 (54.10) is on par with RND-1 (54.33) and maximum number of days taken for first flowering was reported in PSRJ -13008 (63.33). Minimum number of days to flowering was noticed in JBT -38/36 (94.05) is on par with RND-1 (94.33) and maximum number of days taken for 50 % flowering was reported in PSRJ - 13008 (110.67). The results indicated existence of wide variability for each of the parameters studied. Similar findings were reported in Mohan *et al.*, (2009) ^[4] and Singh *et al.*, (2004) ^[10],

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Table 1: Pooled Analysis of Evaluation of Dolichos Bean germplasm for Growth characteristics during the year 2019-2022

	Plant height (m)				No. of branches				Days to first flowering				Days to 50% flowering				No. of pods/cluster			
Treatments	2019- 2020	2020- 2021	2021- 2022	Mean	2019- 2020	2020- 2021	2021- 2022	Mean	2019- 2020	2020- 2021	2021- 2022	Mean	2019- 2020	2020- 2021	2021- 2022	Mean	2019- 2020	2020- 2021	2021- 2022	Mean
PSRJ- 13008	3.62	3.74	3.30	3.55	6.43	6.40	6.28	6.37	62.00	65.00	63.00	63.33	100.00	98.00	110.00	102.67	7.61	7.22	7.30	7.38
PSRJ- 13021-2	3.37	3.15	3.61	3.38	6.87	6.97	6.58	6.81	59.00	58.00	53.00	56.67	107.00	110.00	115.00	110.67	8.26	8.00	8.14	8.13
JBT-38/36	3.00	3.37	3.59	3.32	7.23	7.50	7.91	7.55	56.00	54.00	52.31	54.10	96.00	94.00	92.15	94.05	9.12	8.00	8.59	8.57
PEP	3.12	3.14	3.53	3.26	7.20	7.50	7.66	7.45	59.00	65.00	62.00	62.00	109.00	106.00	100.00	105.00	9.00	8.65	8.63	8.76
RND-1	3.66	3.72	3.79	3.72	6.25	6.87	6.88	6.67	55.00	58.00	50.00	54.33	96.00	94.00	93.00	94.33	9.00	10.00	9.88	9.63
C.D.	0.58	0.41	0.36	0.30	0.43	0.68	0.45	0.40	3.58	4.17	3.45	3.66	5.35	6.13	6.84	6.96	0.68	0.81	0.57	0.75
SE(m)	0.15	0.12	0.17	0.10	0.16	0.15	0.16	0.13	0.98	1.08	1.06	1.17	2.68	1.97	2.18	2.23	0.32	0.41	0.28	0.24
C.V.	6.25	5.13	5.27	5.58	4.17	4.21	3.58	3.66	4.64	5.02	4.32	4.07	4.12	5.06	4.68	4.35	5.68	6.36	5.89	5.67

Yield Parameters

The data pertaining to pooled analysis of yield and yield

contributing characteristics are discussed and presented in Table 2.

Table 2: Pooled Analysis of Evaluation of Dolichos Bean germplasm for yield and yield attributing characteristics during the year 2019-2022

Treatments		Pod Leng	th (cm)			Pod Girtl	h (cm)	Pod weight (g)				
	2019-2020	2020-2021	2021-2022	Mean	2019-2020	2020-2021	2021-2022	Mean	2019-2020	2020-2021	2021-2022	Mean
PSRJ-13008	7.43	8.61	6.88	7.64	2.38	2.34	2.39	2.37	3.73	3.76	3.89	3.80
PSRJ-	14.80	14.63	14.54	14.66	1.70	1.44	1.55	1.56	8.33	7.23	7.15	7.57
13021-2												
JBT-38/36	9.40	11.04	6.65	9.03	1.98	1.51	1.53	1.67	4.67	4.95	4.21	4.61
PEP	14.93	15.41	13.04	14.46	1.70	1.68	1.67	1.68	6.07	5.51	5.37	5.65
RND-1	9.33	10.98	11.20	10.50	1.75	1.65	1.60	1.67	5.07	4.78	4.88	4.91
C.D.	2.29	1.11	0.61	1.59	0.11	0.49	0.422	0.30	1.30	1.10	0.407	0.94
SE(m)	0.74	0.36	0.196	0.55	0.03	0.16	0.135	0.11	0.42	0.35	0.131	0.33
C.V.	13.15	5.89	3.747	9.39	13.60	18.10	15.507	11.41	5.01	3.45	5.125	10.39

Treatments		No. of see	eds/pod			Pod yield/p	olant (g)	Pod yield/ha (t)				
	2019-2020	2020-2021	2021-2022	Mean	2019-2020	2020-2021	2021-2022	Mean	2019-2020	2020-2021	2021-2022	Mean
PSRJ-13008	5.47	4.25	5.62	4.86	539.00	543.75	440.78	507.84	29.94	30.21	24.49	28.21
PSRJ- 13021-2	6.72	6.51	4.83	6.62	704.00	695.00	694.00	697.67	39.11	38.61	38.56	38.76
JBT-38/36	5.48	5.03	4.96	5.25	595.33	578.75	479.92	551.33	33.07	32.15	26.66	30.63
PEP	6.75	7.06	5.70	6.90	702.50	701.00	537.75	647.08	39.03	38.94	29.88	35.95
RND-1	5.28	6.03	5.95	5.65	538.00	574.50	577.62	563.37	29.89	31.92	32.09	31.30
C.D.	1.41	0.86	0.20	0.89	4.27	3.49	5.91	8.29	0.24	0.19	0.33	0.24
SE(m)	0.45	0.28	0.07	0.29	1.37	1.12	1.90	2.89	0.08	0.06	0.11	0.08
C.V.	5.72	9.49	2.42	7.35	0.45	0.36	0.69	0.98	0.45	0.36	0.70	0.51

The above red colour marked parameters are missed in the earlier publication, so I included this parameter. This is the final above table sir.

Podlength was recorded maximum in PSRJ-13021-2 (14.66 cm) is on par with Pusa Early Prolific (14.46 cm) whereas minimum pod length was noticed under PSRJ -13008 (7.64 cm). Pod girth was recorded maximum for PSRJ -13008 (2.37 cm) which was followed by Pusa Early Prolific (1.68 cm) and minimum was reported in PSRJ-13021-2 (1.56 cm). Maximum pod weight was recorded under PSRJ-13021-2 (7.57 g) followed by Pusa Early Prolific (5.65 g) whereas less pod weight was recorded in PSRJ -13008 (3.80 g). The results are in conformity with the findings of Parmar *et al.*, (2013 a and b) ^[6, 7] and Priyanka *et al.*, (2014) ^[8].

Significantly highest number of pods per cluster was reported under RND – 1 (9.63) followed by Pusa Early Prolific (8.76) and lowest number of pods per cluster was noticed under PSRJ-13021-2 (8.13). maximum number of seeds per pod was noticed under Pusa Early Prolific (6.90) is on par with PSRJ-13021-2 (6.62) whereas minimum number of seeds per pod was recorded in PSRJ -13008 (4.86). Pod yield per plant was recorded maximum under PSRJ-13021-2 (697.67 g) followed by the check variety Pusa Early Prolific (647.08 g) and minimum pod yield per plant was reported inPSRJ -13008 (507.84 g). Maximum pod yield per hectare was recorded under PSRJ-13021-2 (38.76 t) followed by the check variety Pusa Early Prolific (35.95 t) and minimum pod yield per hectare was reported inPSRJ -13008 (28.21 t). High-yielding germplasm lines and lines with different pod-types can be utilized further in breeding programmes which is in conformity with the studies of Mohan *et al.*, (2009) ^[4], Singh *et al.*, (2004) ^[10], Upadhyay and Mehta (2010) ^[11] and Singh *et al.*, (2000) ^[9].

Conclusion

From the present investigation it can be concluded that the difference in yield may be attributed to number of pods per plant, pod length, pod girth, pod weight and no. of seeds per pod. Among the germplasm tested the highest pod yield was recorded in PSRJ-13021-2 (38.76 t) this might be due to improved a growth habit, better yield attributes like pod weight, pod length, number of seeds per pod.

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